

**ENGINEERING REPORT
UPGRADE AND EXPANSION
FOR THE
WATER TREATMENT PLANT**

**TOWN OF WEAVERVILLE
BUNCOMBE COUNTY**

August 16, 2017

PREPARED FOR:

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Project No. 16.00369

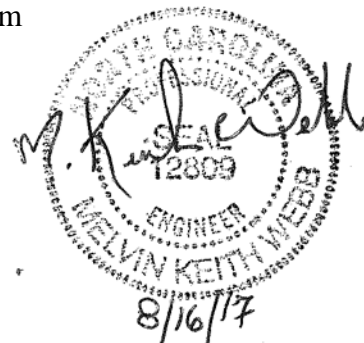


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The Town of Weaverville's water treatment plant (WTP) and raw water intake on the Ivy River have a permitted design capacity of 1.5 million gallons per day (MGD). Treated potable water is pumped to the town's distribution system which supplies a service population of approximately 6,500 customers with an average of 600,000 gallons per day of finished water.

Recent interest from a number of multi-family residential developers and commercial development groups has resulted in the need for a reevaluation of previous demand projections to aid in planning for the potential expansion of the raw water intake and WTP. Previous demand projections presented in the Town's 2016 Local Water Supply Plan (LWSP) did not take these additional demands into account. Since no treatment process is 100% efficient, it should be noted that only approximately 90% of water withdrawn from the Ivy River is expected to be available as finished water to be distributed to customers. This effective water treatment plant capacity of 1.35 MGD is due to the need for treated process water for filter backwash, chemical feed addition carrier water and instrumentation.

In addition to an infill growth projection in the existing service area, a likely area of expansion to the north and west of the existing service area has been identified, and its potential water demand has been estimated. Assuming gradual expansion into this service area, the water system could exceed 80% of its capacity by 2021, and 100% by 2027. Assuming no expansion of the service area, infill alone would cause the water system's demands to exceed 80% of its capacity by 2021, and 100% of its capacity by 2038.

Expansion of the town's water supply is subject to approval by the North Carolina Division of Water Resources. The town's water supply, the Ivy River, has an estimated 7Q10 stream flow at the raw water intake site of 8.70 MGD. Withdrawal of more than 20% of the published 7Q10 flow for water supply requires additional review and study to ensure the health of the aquatic habitat in the stream. An expansion of the raw water intake and WTP from 1.5 MGD to 3.0 MGD will increase the percentage of the 7Q10 flow for water supply to equal 34.5%. Preliminary discussions also requested a review of expansion of the WTP to a capacity of 4.50 MGD. The 4.50 MGD expansion would result in the removal of 52% of the 7Q10 flow in the Ivy River for water supply and it is unlikely that a request for expansion to 4.5 MGD would be approved.

The estimated cost to expand the water treatment plant and intake from 1.5 MGD to 3.0 MGD and install additional water main to convey finished water to the distribution system is \$7,553,000. A cost estimate for expansion to 4.5 MGD was not completed, since that expansion is unlikely to be approved.

Study Purpose

The Town of Weaverville owns and operates a water treatment plant (WTP) which provides potable water to the customers of the town. The water treatment plant was brought online in 1998 and has a design treatment capacity of 1.50 MGD (million gallons per day) and utilizes a convention water treatment configuration with raw water withdrawn from the Ivy River.

The Ivy River has proven to be an excellent water source, but the capacity is somewhat limited during low flow and drought conditions. The Ivy River forms the boundary between Buncombe County and Madison County downstream of the I-26 bridge and has a drainage area at the water treatment plant raw water intake of 112 square miles (71,680 acres). As a part of the original water treatment plant construction the Ivy River watershed was protected by the North Carolina legislature under the provisions of Chapter 153A, Article 6, Section 121 and Chapter 143, Article 21. The Ivy River is classified as a WS-II water supply by the Department of Environmental Quality, Division of Water Resources.

Weaverville's water distribution system consist of approximately 66 miles of water lines ranging in size from 20-inch to 2-inch. From the WTP located on Sams Road, in northern Buncombe County, a 20-inch water line extends along Old Mars Hill Highway to Clarks Chapel Road at North Buncombe High School. The distribution system then reduces to a 10-inch line which extends to Hamburg Mountain Road and a 1.0 MG (million gallon) water storage tank. The distribution system extends southward along Old Asheville Highway (Merrimon Avenue) to an inter-connection with the City of Asheville water system at which point emergency water may be purchased. Additional system storage is provided at this area through the Dubose Hill tank.

The water system extends westward from the I-26/US 25/70 interchange at Weaver Boulevard to the intersection of Monticello Road. Water service is also provided to much of the Reems Creek Valley with the distribution system extending along Reems Creek Road to Ox Creek Road with system storage in this area provided by the Ox Creek tank. The Ridge tank on Union Chapel Road provides an additional 1.0 MG of storage for fire protection and domestic system demands in the Reems Creek area.

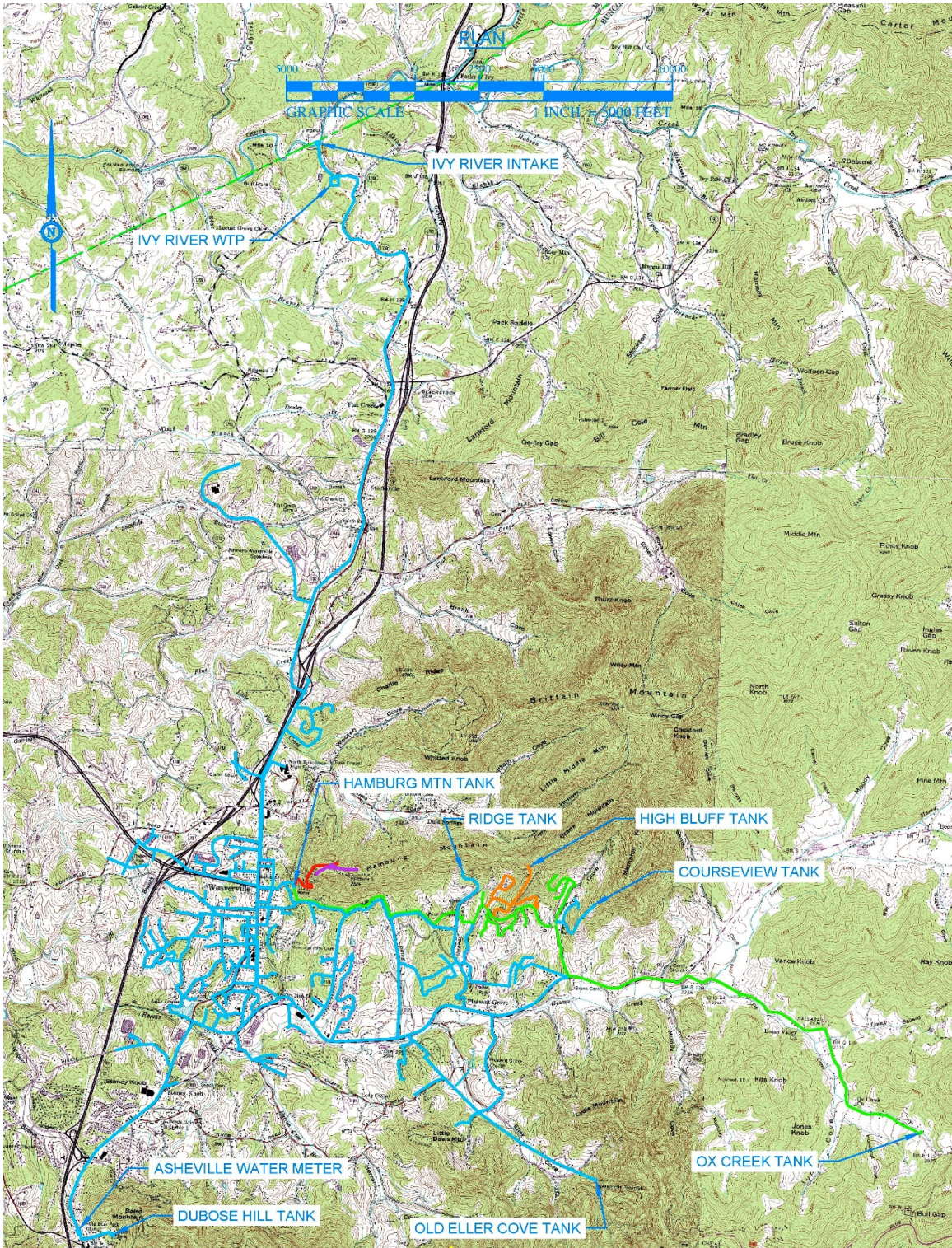


Figure 2.0 – Existing Distribution System Map

Over a period of the past two to three years there has been a renewed and increased interest for water service to serve proposed new multi-family and single family residential developments in the Weaverville area as a part of the improved economic conditions in Weaverville and Western North Carolina. To date the requests approved by Weaverville

for new water connections when added to the current water treatment plant usage result in a projected water demand that approaches 70% of the water treatment plant's 1.50 MGD permitted design capacity, or 76% of the water treatment plant's 1.35 MGD finished water production capacity.

These recent requests for water service and their associated demands when combined with the current system demands equates to the projected future growth demands for Weaverville for the year 2030 planning period. The town's most recent LWSP filed with the Division of Water Resources included a projected water demand for the 2030 planning year of 1.123 MGD. This demand was projected to increase to 1.450 MGD by the 2060 planning year.

Rules Governing Public Water Supply in North Carolina recommend that water systems begin the planning process to address future water supply demands whenever the demand on the current system is at 80% of the permitted WTP capacity. Given the increased demands for water service the purpose of this report is to evaluate the projected potential increased water system demands should the Town of Weaverville water system be expanded beyond its current service area and with that expansion the increased water system demands.

This Preliminary Engineering Report will also evaluate the available water supply capacity from the Ivy River and develop opinions of probable cost to expand the WTP.

3.1 Project Location

The Town of Weaverville is located in the northern portion of Buncombe County at the intersection of I-26 and US 25-70. This accessibility to major transportation systems makes the town an attractive location for continued growth. I-26 serves as the major transportation corridor to Mars Hill in adjoining Madison County and eastern Tennessee (Erwin, Johnson City and Kingsport) as well as the northern mountains of Western North Carolina and Yancey, Mitchell and Avery Counties. US 25-70 continues from Weaverville in a westerly direction to connect Marshall, the county seat of Madison County, then continuing to Hot Springs and into Eastern Tennessee at Newport and I-40.

Weaverville continues to see increased growth as a result of its small town charm along with regional topography which makes residential development cost attractive. The town's proximity to Asheville also contributes to the likelihood of increased growth. The 2010 census indicated a population of 3,120 for the town. Updated estimates by the US Census Bureau indicate the current population to be 3,981, or a growth of more than 25% over a 6 year span. This growth is expected to continue. Along with the growth there will be an increased demand of water to meet these growth demands.

Figure 3.1 provides a general location map for Weaverville.



Figure 3.1 – Vicinity Map

Weaverville’s WTP and the main source of water is located on the Ivy River off of Sams Road near the Madison County line. The WTP was completed in 1997 and has a design capacity of 1.50 MGD. The 2016 average daily withdrawal was approximately 600,000 gpd, with seven-day peak demands averaging around 750,000 MGD. However, this use is a historical outlier, with the previous three years all exceeding 750,000 gpd on average days.

A raw water pump station with two vertical turbine pumps withdraws water from the Ivy River and conveys water to the plant for treatment. A coarse bar screen/rack is in place to protect the pumps and remove larger inorganic materials.

The raw water is pumped to a pretreatment unit (Claricone) for the removal of the majority of the sediment in the raw water. The Claricone unit was constructed to comply with the Rules Governing Public Water Supplies that require water systems which utilize source waters that experience excessive changes in raw water turbidity or water quality to provide either off-stream raw water storage or mechanical pretreatment prior to treatment. Similar installations utilizing the Claricone unit as a mechanical pretreatment was presented to the Public Water Supply Section of the Division of Water Resources during the original design process and was approved. Operational experience of the Claricone has demonstrated its effectiveness in the pretreatment of the water.

From the Claricone treated raw water flows to a flash mix unit for the addition of chemicals to enhance the sedimentation process, if required in addition to the chemicals added to the influent flow to the Claricone, and then to two flocculation basins where the coagulation process to remove sediment from the water continues with the chemical addition creating an environment where the lighter sediment particles combine to create a floc material which can be removed by gravity settling in the two sedimentation basins following.

Final treatment is accomplished through two gravity mixed media filters which remove 99.9% of the sediment and material in the water and produce an excellent finished water for the customers of the Weaverville system. After filtration the water is disinfected using chlorine and flows to the on-site clearwell for final storage prior to being pumped into the distribution system.

Two high service vertical turbine pumps convey finished water from the clearwell through the 20-inch water line along Old Mars Hill Highway to the Hamburg Mountain water tank for system storage and distribution.

It should be noted that the effective WTP capacity is less than the 1.50 MGD design capacity as a result of the amounts of finished water required for the operation of the WTP. Finished water is required for daily operation of the WTP including filter backwash, chemical feed addition carrier water and process sampling instrumentation water. This local usage reduces the effective water treatment plant production capacity to 1.35 MGD which is available for pumping to the distribution system and the customers.

The Weaverville water system currently provides service to those areas inside of the corporate limits and to a section along Reems Creek Road. Historically water service outside of the corporate limits has been limited. In order to project the impact on future demands of the water system associated with expansion of the system this report looked at two scenarios. Scenario #1 being the continued in-fill and development of the area within the current Weaverville corporate limits. Scenario #2 being the expansion of the water system to the west of Weaverville into the area bounded by Monticello Road on the east and the edge of the current service boundary and extending westward to New Stock Road. This area would be bound on the north by Lower Flat Creek Road at North Buncombe High School and North Buncombe Elementary School and extend south to the intersection of New Stock Road and Monticello Road. As shown in Figure 4.0 below, the expanded service area consists of approximately 1,596 developed parcels (3,500 acres), 130 undeveloped or underdeveloped parcels (831 acres, shown in red), and 112 parcels (382 acres) already served by the existing distribution system.

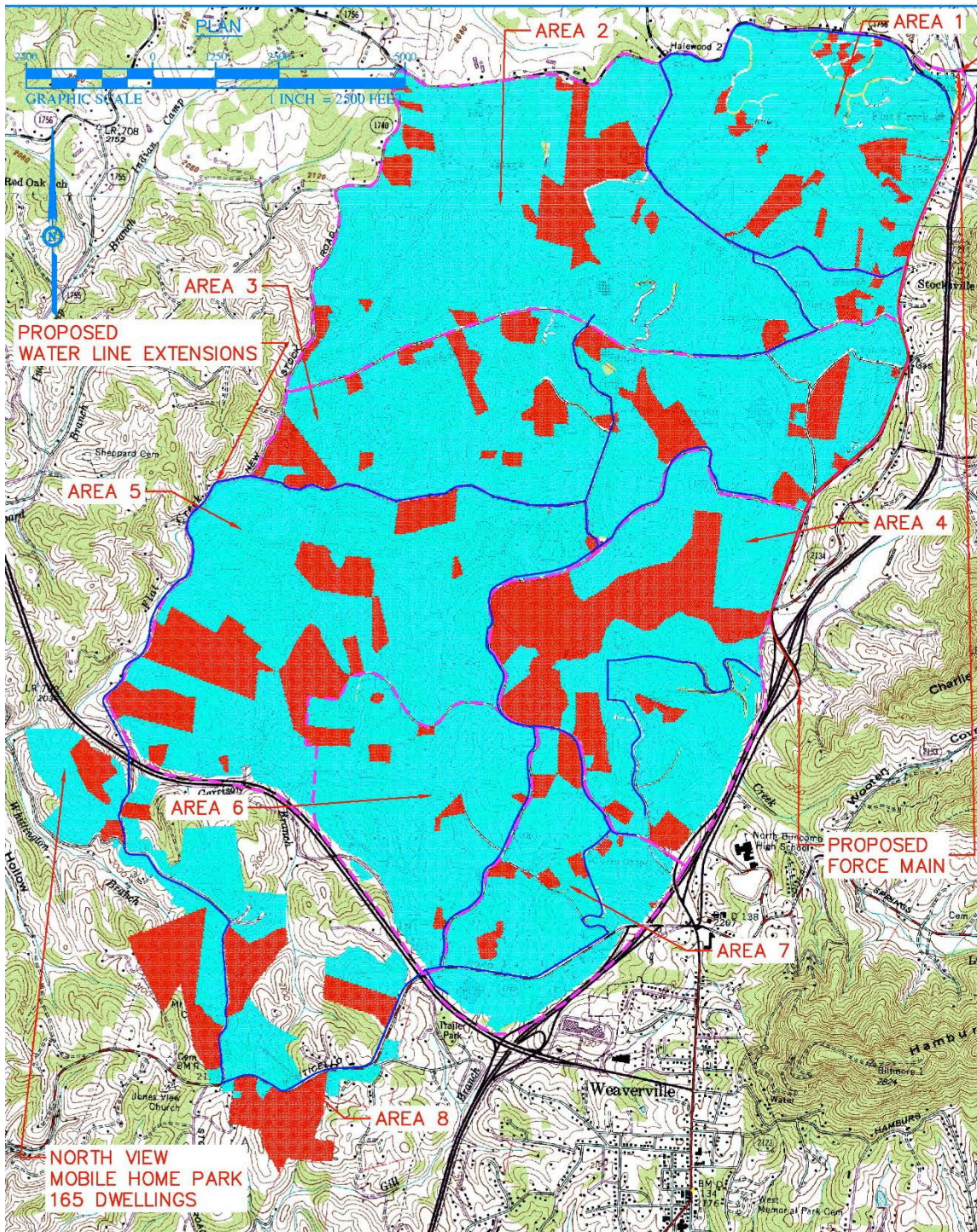


Figure 4.0 – Proposed Expanded Service Areas

This area currently has a somewhat dense development of single family homes and there are a number of larger tracts of land which could potentially be developed. Historically homes in this area have been supplied potable water through the development of groundwater wells. Many of these wells have limited capacity and the presence of higher than acceptable concentrations of iron, manganese and sediment are often reported. While the water quality is acceptable these contaminants and the limited capacity can create concern for the homeowner.

This study also assumes continued infill of the undeveloped areas in Reems Creek Valley adjacent to the existing water lines.

Demand is expected to grow within the existing service area by approximately 121% between 2017 and 2070 assuming the population within the service area continues to increase at the same rate previously documented by the 1997-2016 Local Water Supply Plans, and per capita water use remains constant at the 1997-2016 average. Demand projections for the expanded service area to the north and west of the existing service area assume the NCDEQ standard of 400 gallons per day per acre for undeveloped areas and 400 gallons per day per parcel for developed parcels.

Demand for outstanding commitments has been allocated with the assumption that those commitments would be fulfilled within the next 4 years, with one additional development whose outcome is less certain being completed in the fifth year. The total flow owing to these outstanding commitments is almost 349,000 gallons per day. The 165 dwellings at the North View Mobile Home Park were also considered separately.

In total, the potential water demand of the expansion area is estimated to be 0.892 MGD assuming full development of the area. This demand growth was applied linearly to the planning period from 2017-2070, but could more realistically be expected to be added to the system in blocks as water mains are expanded. Town staff have observed that seven-day peak flows are approximately 25% higher than the average daily withdrawal. This peaking factor was applied to the existing service area's demand projection but not to the expanded service area or allocated flows, whose demands are already assumed to include peak flow.

The demand projections shown in this report are for salable water as shown historically in the town's LWSPs as the sum of residential, commercial, industrial, and institutional demand. A reserve of approximately 10% of the plant's withdrawal capacity, or 150,000 gallons per day, for filter backwashing, cleaning, and other treatment system use should be considered unsalable water, reducing the system's finished water production capacity from 1.5 MGD to around 1.35 MGD. The WTP operation staff continues to make process equipment changes to make operation of the WTP as efficient as possible and to keep the unsalable water to a low level.

Demand projections for the system are shown in Table 4.0.1 and include salable water, water for allocated flows already granted and for infill and growth of the system.

Water systems must be able to meet not only average daily demands, but peak demands. Study of the historical usage of the Weaverville system indicates that peak demands range from 1.2 to 1.25 of the capacity. These peak day demands reflect the increased demand for water during the warmer, drier summer months and the demand for small amounts of lawn irrigation water and a general increase in consumption during these warmer months as well as peak weekend resulting from increased tourism demands. The water system must be able to supply these peak demands. For the purpose of this study a peaking factor of 1.25 has been applied to the average daily demands and is reflected in the following demand tables.

With the new demand growth assumptions, projected demand for finished water can be expected to exceed 80% of the existing system's 1.35 MGD effective capacity as soon as 2021. Without expansion of the service area, projected demand could exceed 80% of capacity in the same year. The system would reach 100% of capacity by 2027, or 2038 without expansion of the service area.

Table 4.0.1 shows projected demands without expansion into the service areas identified in Figure 4.0, as well as the percentage of the 1.35 MGD design capacity of the treatment plant the total demand constitutes:

**Table 4.0.1
Demand Projection without Service Area Expansion**

Year	Projected Demand (MGD)				Percent of Capacity	
	Existing Service Area	Allocated Flows	Average Day	Peak Day	Average Day	Peak Day
2017	0.682	0.000	0.682	0.853	51%	63%
2020	0.729	0.275	1.004	1.186	74%	88%
2025	0.807	0.349	1.156	1.358	86%	101%
2030	0.885	0.349	1.234	1.455	91%	108%
2035	0.963	0.349	1.312	1.553	97%	115%
2040	1.041	0.349	1.390	1.650	103%	122%
2045	1.119	0.349	1.468	1.747	109%	129%
2050	1.197	0.349	1.546	1.845	114%	137%
2055	1.275	0.349	1.624	1.942	120%	144%
2060	1.353	0.349	1.702	2.040	126%	151%
2065	1.431	0.349	1.780	2.137	132%	158%
2070	1.509	0.349	1.858	2.235	138%	166%

Table 4.0.2 shows projected demand including expansion into the service areas identified in Figure 4.0:

**Table 4.0.2
Demand Projection with Service Area Expansion**

Year	Projected Demand (MGD)					Percent of Capacity	
	Existing Service Area	Allocated Flows	Expanded Service Area	Average Day	Peak Day	Average Day	Peak Day
2017	0.682	0.000	0.000	0.682	0.853	51%	63%
2020	0.729	0.275	0.039	1.042	1.225	77%	91%
2025	0.807	0.349	0.136	1.292	1.493	96%	111%
2030	0.885	0.349	0.233	1.467	1.688	109%	125%
2035	0.963	0.349	0.330	1.641	1.882	122%	139%
2040	1.041	0.349	0.427	1.816	2.077	135%	154%
2045	1.119	0.349	0.524	1.991	2.271	148%	168%
2050	1.197	0.349	0.621	2.166	2.465	160%	183%
2055	1.275	0.349	0.718	2.341	2.660	173%	197%
2060	1.353	0.349	0.815	2.516	2.854	186%	211%
2065	1.431	0.349	0.911	2.691	3.049	199%	226%
2070	1.509	0.349	1.008	2.866	3.243	212%	240%

The Town of Weaverville WTP utilizes the Ivy River as the source for raw water. The Ivy River is a WS-II protected water supply under the rules established by the North Carolina Department of Environmental Quality, Division of Water Resources. Drought conditions experienced during the period from 2000 to 2009 and again in the past couple of years has had the impact of reducing the average stream flows for many streams in Western North Carolina. New estimates of stream flow include both the impact of the drought conditions mentioned as well as an increased source of data from which to analyze stream flows.

North Carolina Division of Water Resources is responsible for the review and approval of permits for the withdrawal of water from streams for all flows over 100,000 gpd. For water treatment facilities the amount available for withdrawal is typically based upon the 7Q10 flow of the stream where 7Q10 flow is defined as that statistical low flow condition in the stream which occurs over a seven (7) consecutive day period once every 10 years. Water treatment facilities are typically allowed to take up to 20% of the 7Q10 stream flow without the need for special studies.

The United States Geological Service (USGS) was contacted to provide an updated 7Q10 flow for the Ivy River at the Weaverville raw water intake. This area represents the 112 square mile drainage area. USGS provided a revised 7Q10 flow estimate for the Ivy River at the Weaverville Raw Water Intake of 8.70 MGD.

With the current WTP design/permitted capacity of 1.50 MGD this reflects removal of approximately 17% of the 7Q10 flow.

One scenario included in the water plant study is the expansion of the plant to a capacity of 3.0 MGD. Under this scenario the plant would withdraw approximately 34.5% of the 7Q10. To obtain approval for this amount of flow from the Ivy River will require the completion of an in-stream aquatic habitat study of the river in conjunction with the Division of Water Resources. Based upon other similar water systems permitted in North Carolina we believe that once the in-stream habitat study is completed that approval to withdraw up to 3.0 MGD can be obtained. However this approval will most likely require a minimum downstream flow requirement for the withdrawal. This would result in a requirement to implement an aggressive drought management plan in the event of future drought conditions to maintain this in-stream flow.

For scenario #1 McGill Associates task included the development of an estimated cost for the expansion of the water plant. The estimated cost to expand the Ivy River Water Treatment Plant from a capacity of 1.50 MGD to 3.0 MGD is \$7,553,000. A breakdown of this cost is provided below:

The second scenario of our study was to evaluate the cost to expand the water treatment plant to 4.50 MGD. This flow would represent the removal of 52% of the 7Q10 flow from the Ivy River. McGill Associates does not believe that approval for this amount of withdrawal will be permitted. Therefore we have not completed a cost estimate for this expansion.

Water Treatment Plant Expansion

Due to the limited flow in the Ivy River the maximum expansion of the Ivy River Water Treatment Plant will be the doubling of the capacity to 3.0 MGD. At the design flow of 3.0 MGD this will represent a withdrawal of 35% of the 7Q10 flow. The removal of this percentage of the 7Q10 flow will require special permission from the Division of Water Resources and will require a special in-stream flow study to determine if this amount of withdrawal will have any negative impact on the aquatic habitat of the stream.

The Town of Weaverville should expect that along with the approval to withdraw 3.0 MGD from the Ivy River that there will be a requirement for a minimum in-stream flow downstream of the raw water intake. In future instances of low stream flows the town will be required to implement aggressive water conservation measures and to maintain a certain in-stream flow in the Ivy River. The exact amount of in-stream flow and the conservation measures will be determined as a part of the future aquatic habitat study and consultation with the Division of Water Resources.

The upgrade of the WTP will consist of the construction of a plant layout on the north east side of the current control/filter building and will include:

1. Upgrade of the raw water pump station to increase the pumping capacity by the addition of a third pump
2. New Claricone pretreatment unit
3. Two new flocculation basins, and two new sedimentation basins.
4. Two new mixed media gravity filters with controls
5. Construction of a second clearwell

The estimated cost for these improvements is shown in Table 7.1.

Table 7.1
IVY RIVER WATER TREATMENT PLANT
EXPANSION FOR 1.50 MGD to 3.0 MGD
ESTIMATE PROJECT COST

Item #	Description	Unit	Qty	Unit Cost	Total Amount
1	Mobilization	LS	1	\$153,000	\$153,000
2	Filter Media, Underdrain, Troughs, Agitators	LS	1	\$270,000	\$270,000
3	Filter Valves and Actuators	EA	10	\$7,000	\$70,000
4	Raw Water Pumps	EA	2	\$150,000	\$300,000
5	Finished Water Pumps	EA	2	\$150,000	\$300,000
6	12" DIP Water Line	LF	13,300	\$100	\$1,330,000
7	Finished Water Pump Station	LS	1	\$250,000	\$250,000
8	Chemical Feed Modifications	LS	1	\$100,000	\$100,000
9	Flocculators	LS	4	\$20,000	\$80,000
10	Settling Basins, Flocculation Basins, and Filter Bays	LS	1	\$475,000	\$475,000
11	Backwash Sludge Basin	LS	1	\$275,000	\$275,000
12	0.250 MG Clearwell	LS	1	\$390,000	\$390,000
13	36'6" Diameter Claricone Clarifier	LS	1	\$850,000	\$850,000
14	Yard Piping	LS	1	\$100,000	\$100,000
15	Electrical Improvements	LS	1	\$300,000	\$300,000
Subtotal					\$5,243,000
Contingency (20%)					\$1,050,000
Total Construction Cost					\$6,293,000
Technical Services (20%)					\$1,260,000
Total Construction Cost					\$7,553,000

Sewer Extension to Jupiter Road

One potential future commercial growth area for Weaverville that already has available water service is the Jupiter Road/Barnardsville exit off of I-26. This is the site of the old Flat Creek Elementary School. In the past decade there has been considerable residential development in this area and the potential for commercial development exist. However the lack of sanitary sewer service to this area prevents most commercial development as there is inadequate room for an on-site wastewater treatment system. To provide sewer service to this area a sanitary sewer lift station be constructed near the intersection of Jupiter Road and Old Mars Hill Highway in order to collect flows from the nearby densely-populated area between Jupiter Road and McLean Road. The lift station would be connected to an existing Metropolitan Sewerage District manhole on North Buncombe School Road by approximately 13,450 linear feet of 4” ductile iron force main. The cost for this project, not including collection lines, is likely to be in excess of \$2,000,000 depending on the route of the force main, location of the lift station, and subsurface conditions.

Appendix 1

Response from USGS Concerning Ivy River Intake Location 7Q10 Estimate

From: Weaver, John [<mailto:jcweaver@usgs.gov>]
Sent: Monday, March 27, 2017 11:55 AM
To: Mike Dowd <Mike.Dowd@Mcgillengineers.Com>
Cc: John C Weaver <jcweaver@usgs.gov>
Subject: Response from USGS concerning...Re: 7Q10 Estimate

Mr. Dowd,

In response to your inquiry about the low-flow characteristics (7Q10) for Ivy River (Creek, as noted on topographical map) in the vicinity of Democrat in northern Buncombe County, the following information is provided:

A check of the low-flow files here at the USGS South Atlantic Water Science Center (Raleigh office) indicates a previous low-flow determination on Ivy River near Mars Hills (station id 0345282105, drainage area 112 sqmi), located just downstream of U.S. Highways 19/23 (Interstate 26), which is upstream from the point of interest. Completed in March 1989, the 7Q10 was estimated at 13 cfs (equivalent to about 0.12 cfs per square mile drainage area), based on transfer of flow characteristics from two nearby upstream USGS partial-record sites in the Ivy River basin.

No USGS discharge records are likewise known to exist for the point of interest.

In the absence of site-specific discharge records sufficient for a low-flow analysis, estimates of low-flow characteristics at ungaged locations are determined by assessing a range in the low-flow yields (expressed as flow per square mile drainage area, of cfs/m) at nearby sites where such estimates have previously been determined.

A basin delineation completed using the online USGS StreamStats application for North Carolina (http://water.usgs.gov/osw/streamstats/north_carolina.html) indicates the drainage area for the point of interest is 112 sqmi.

For streams in Buncombe County, low-flow characteristics published by the USGS are provided in two reports:

(1) The first is a statewide report completed in the early 1990's. It is USGS Water-Supply Paper 2403, "Low-flow characteristics of streams in North Carolina" (Giese and Mason, 1993). An online version of the report is available at <http://pubs.usgs.gov/wsp/2403/report.pdf>. The report provides the low-flow characteristics (based on data through 1988) via regional relations and at-site values for sites with drainage basins between 1 and 400 sqmi and not considered or known to be affected by regulation and/or diversions.

(2) The second is a statewide report published in March 2015. It is USGS Scientific Investigations Report 2015-5001, "Low-flow characteristics and flow-duration statistics for selected USGS continuous-record streamgaging stations in North Carolina through 2012" (Weaver, 2015). The report is available online at <http://pubs.usgs.gov/sir/2015/5001/>. The

report provides updated low-flow characteristics and flow-duration statistics for 266 active (as of 2012 water year) and discontinued streamgages across the state where a minimum of 10 climatic years discharge records were available for flow analyses.

Inspection of both reports indicates the presence of 3 nearby selected USGS partial-record sites (2) and continuous-record streamgage (1) in general vicinity of the point of interest where low-flow characteristics have previously been published. Among these 3 sites, the annual 7Q10 yields range from about 0.09 to 0.13 cfsm (average approximately 0.11 cfsm).

Applying the above annual 7Q10 yield range to the drainage area for the point of interest (112 sqmi) results in an estimated annual 7Q10 discharge from 10.1 to 14.6 cfs (average approximately 12.3 cfs).

Please note the estimated flows are provided in units of cubic feet per second (cfs).

Please understand the information provided in this message is based on a preliminary assessment and considered provisional, subject to revision pending further analyses.

Hope this information is helpful.

Thank you.

Curtis Weaver

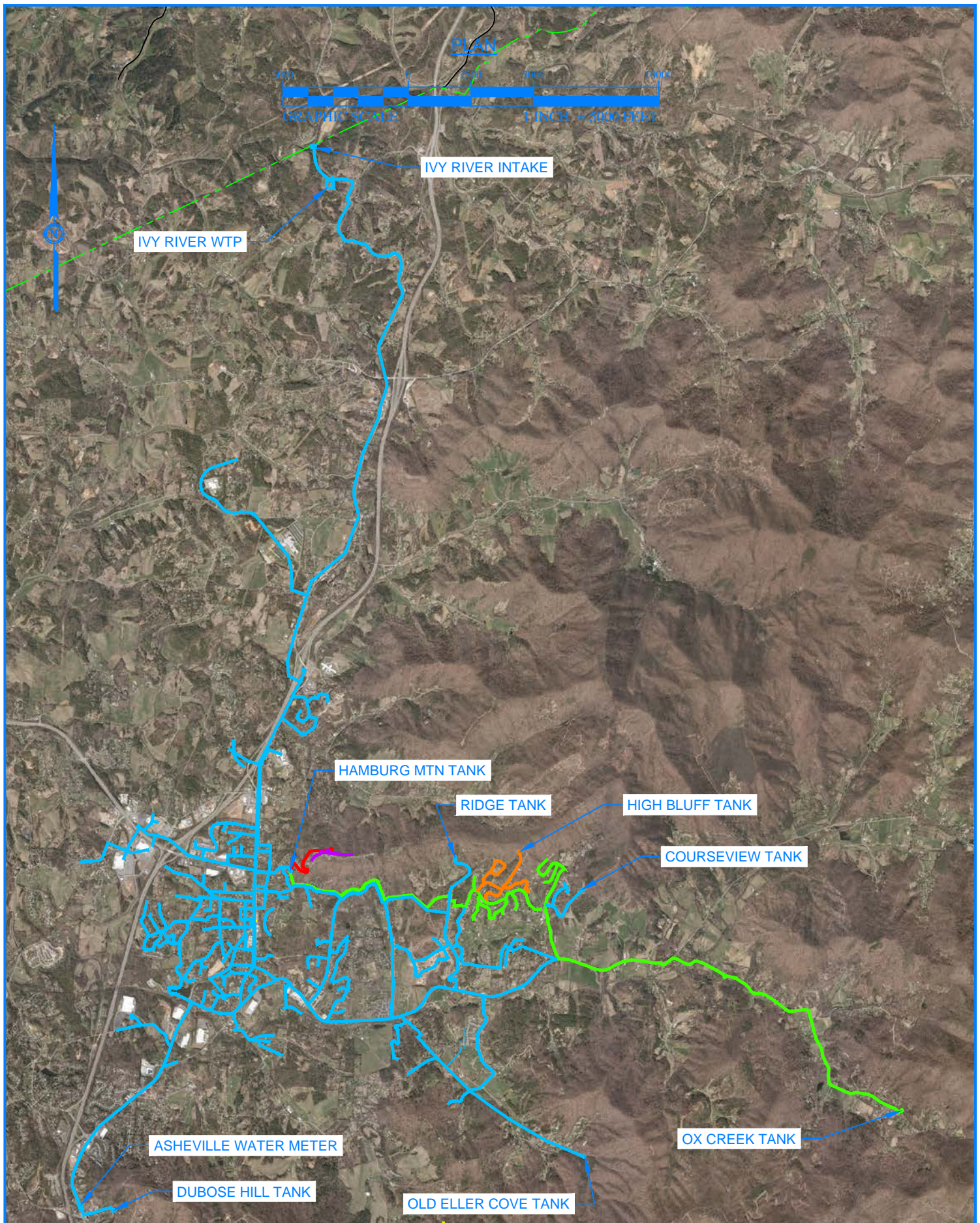
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Online: <http://nc.water.usgs.gov/>

Appendix 2

Figures

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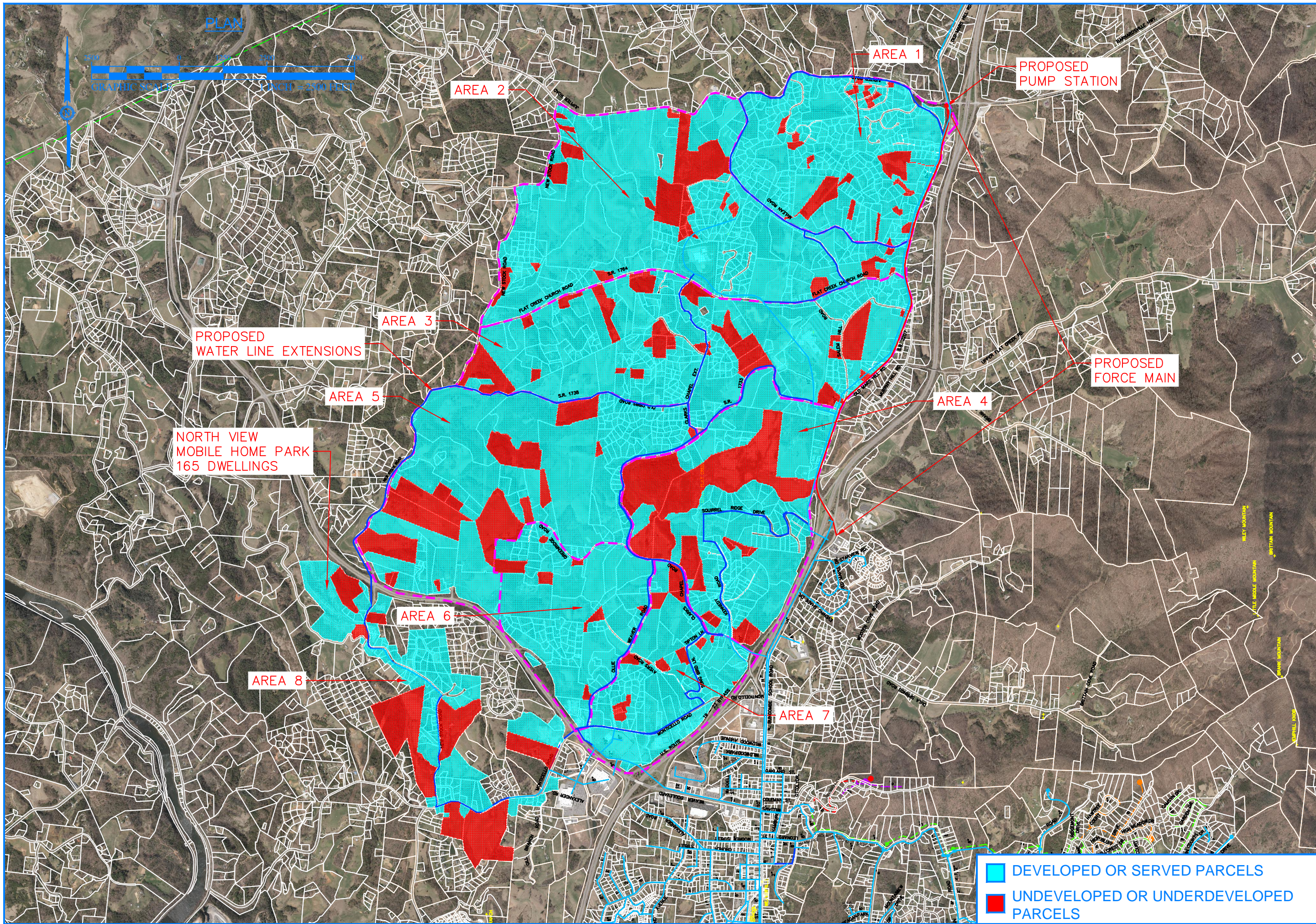
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WATER TREATMENT PLANT
 UPGRADE AND EXPANSION
TOWN OF WEAVERVILLE
 BUNCOMBE COUNTY, NORTH CAROLINA

EXISTING SERVICE AREA

FIGURE
A-1

I:\Drawings\2016\16.00369\Design\Water\Drawings\Service Areas.dwg 8/10/2017 9:11 AM MICHAEL WHITTENBURG



- DEVELOPED OR SERVED PARCELS
- UNDEVELOPED OR UNDERDEVELOPED PARCELS